

McDevitt & Miller LLP
Lawyers

(208) 343-7500
(208) 336-6912 (Fax)

420 West Bannock Street
P.O. Box 2564-83701
Boise, Idaho 83702

Chas. F. McDevitt
Dean J. (Joe) Miller
Celeste K. Miller

October 24, 2014

Via Hand Delivery

Jean Jewell, Secretary
Idaho Public Utilities Commission
472 W. Washington St.
Boise, Idaho 83720

Re: IPC-E-14-18; Sierra Club Testimony of Udi Helman

Dear Ms. Jewell:

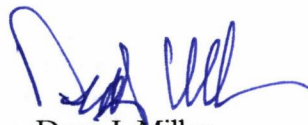
After filing Mr. Helman's Direct Testimony yesterday I discovered, due to oversight on my part, on pages 9 and 10 that citations to various other integration studies were omitted.

I am transmitting the original and nine copies of corrected pages 9 and 10 that include those citations. Kindly replace the earlier pages with these. For the convenience of the Reporter a disc containing the corrected pages is also enclosed.

I hope this oversight will not cause inconvenience to the parties.

Very Truly Yours,

McDevitt & Miller LLP



Dean J. Miller

DJM/hh
C: Party of record, w/enclosure, by e-mail
Enclosures

RECEIVED
2014 OCT 24 PM 3:44
IDAHO PUBLIC
UTILITIES COMMISSION

1 results from the model in response to data requests, and these results show some of the
2 operational changes needed for solar integration.

3 **Q. How do the solar integration costs in the Study compare to other solar integration**
4 **studies?**

5 **A.** Given this methodological evaluation, the next issue is whether the resulting integration
6 costs are comparable to those from other studies, and if so, why. As noted in Phil DeVol's
7 testimony, the solar integration costs found in the study are comparable to those in other
8 studies that use similar simulation methods. There are a range of methodologies and some
9 charges are developed more transparently than others, but most appear to fall into a range
10 of \$1 - \$6/MWh, depending on the quantity of solar modeled, with higher costs for higher
11 quantities. Some of these integration cost forecasts are used for integrated resource
12 planning studies, while others are used to adjust avoided cost rates.

13 A PV integration study performed for NV Energy calculated integration charges in the
14 range of \$3/MWh for the first 150 MW of PV to about \$7/MWh for 1,042 MW of PV, and
15 an additional \$1/MWh for PV curtailment costs in the latter case. PacifiCorp in Utah has
16 proposed a solar integration charge deducted from its avoided cost rate for QF contracts of
17 \$2.18/MWh for tracking solar and \$2.83/MWh for fixed solar. APS has calculated a solar
18 integration cost of \$2.08/MWh for 1,038 MW of solar, and \$3.04/MWh for 1,669 MW of
19 solar. (Black & Veatch, Solar Photovoltaic (PV) Integration Cost Study, conducted for
20 APS, 2012.) BPA has calculated an integration charge of \$0.21/kW-month for 23 MW of
21 solar. LADWP has calculated an integration of \$7.64/MWh for up to 614 MW of solar.
22 (Cited in Los Angeles Department of Water and Power, 2013 Power Integrated Resource
23 Plan. December 16, 2013.) Tri-State has calculated a charge of \$2.18/MWh for 20 MW of
24 solar. (Tri-State Generation and Transmission Association, Inc. *Integrated Resource*
25 *Plan/Electric Resource Plan*, November 2010.) TEP has calculated a

1 \$5.20/MWh cost for the first 100 MW of solar PV, with an additional \$1.10/MWh
2 for each additional 100 MW. (Tucson Electric Power. 2014 Integrated Resource
3 Plan. April 1, 2014.)

4 However, like the IPC study, these are all models attempting to estimate
5 future integration costs. We don't know whether these estimates are correct or
6 incorrect for the particular systems modeled until there is more operating
7 experience with wind and solar on these systems.

8 **Q. What power systems can we look to for examples of solar integration at high**
9 **penetrations?**

10 **A.** There are a number of power systems around the world that have already
11 experienced high and increasing levels of solar generation, whether utility scale or
12 distributed. These range from island systems, such as Hawaii, to large US states,
13 such as California, and, of course, Germany. Of these, in the U.S., only California
14 also has a transparent wholesale market operated by the California Independent
15 System Operator (CAISO), which gives more insight into how market prices and
16 costs are evolving with renewable integration.

17 **Q. How much renewable energy is now on the California ISO power system,**
18 **measured in the aggregate?**

19 **A.** Under the 33% RPS, the California load-serving entities are required to achieve
20 33% renewable energy, not including hydro, by 2020. Compliance could come
21 earlier than 2020 due to the potential for changes in financial incentives (e.g., the
22 investment tax credit), which is leading solar projects to come on-line earlier. Of
23 these load-serving entities, the California investor-owned utilities are jurisdictional